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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JAMES O'NEIL, PETER MARDILOVICH,  
GREGORY HERMAN, and DAVID CHAMPION

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Appeal 2008-004533  
Application 10/697,618  
Technology Center 1700

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Decided: September 28, 2009

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Before JEFFREY T. SMITH, LINDA M. GAUDETTE, and  
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

Statement of the Case

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 1-11, 15-26, and 30-37. We have jurisdiction under 35 U.S.C. § 6.<sup>1</sup>

We REVERSE and ENTER A NEW GROUND OF REJECTION.

Appellants' invention relates to a method of forming a fuel cell electrode. (Spec. 3). Claim 1 is illustrative:

1. A method of forming a thin-film fuel cell electrode, comprising:  
providing a substrate and at least one deposition device;  
developing a deposition characteristic profile having at least one porous layer based on pre-determined desired electrode properties; and  
forming a film in accordance with said deposition characteristic profile by depositing material from said deposition device while varying a relative position of said substrate in relation to said deposition device with respect to at least a first axis.

The following rejections are presented for our review:

- 1) Claims 1, 2, 5, 6, 9, 15, 16, 20, 21, 24, 31, 32, and 34-36 were rejected under 35 U.S.C. § 103(a) based on the combined teachings of Barnett, U.S. Patent No. 5,395,704, issued March 7, 1995, and Montcalm, U.S. Patent No. 6,668,207, issued December 23, 2003.
- (2) Claims 3 and 17 were rejected under 35 U.S.C. § 103(a) based on the combined teachings of Barnett, Montcalm, and Tsai<sup>2</sup>.

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<sup>1</sup> Pending claims 12-14, 27-29, and 67-86 have been indicated as containing allowable subject matter. (Final Office Action, p. 8; App. Br. 2).

(3) Claims 4 and 19 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Barnett, Montcalm, and Ueda Japanese Patent Application JP 63-195263, published August 12, 1988 (translation of record).

(4) Claims 7, 8, 10, 11, 18, 22, 25, 26, 30, and 33 were rejected under 35 U.S.C. § 103(a) over the combined teachings of Barnett, Montcalm, and Kobayashi, Japanese Patent Application JP 05-021347 A1, published January 29, 1993 (translation of record).

(5) Claim 23 was rejected under 35 U.S.C. § 103(a) over the combined teachings of Barnett, Montcalm, Kobayashi, and Wang, U.S. Patent No. 6,364,956 issued April 2, 2002.

(6) Claim 37 was rejected under 35 U.S.C. § 103(a) over the combined teachings of Barnett, Montcalm, and Surampudi, U.S. Patent No. 5,773,162 issued June 30, 1998.

## II. ISSUE

The main dispute between the Examiner and Appellants centers on the question of whether there is a reason to combine the teachings of Barnett and Montcalm in order to teach or suggest “developing a deposition characteristic profile having at least one porous layer based on pre-determined desired electrode properties” as recited in the claims. In order to answer this question, it is necessary to understand the scope of what is claimed. Because the claims do not particularly point out and

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<sup>2</sup> Tsai et al. “*Bias Sputter Deposition of Dense Yttria-Stabilized Zirconia Films on Porous Substrates*”, J. Electrochem. Soc., Vol. 142, No. 9, September 1995, pp.3084-3087.

distinctly claim the subject matter which Appellants regard as their invention, the scope of the claims cannot be ascertained without considerable speculation and we cannot decide the question regarding the reason to combine. Therefore, we procedurally reverse the obviousness rejections and enter the following new ground of rejection pursuant to our authority under 37 C.F.R. § 41.50(b). *See In re Steele*, 305 F.2d 859, 862-63 (CCPA 1962) (reversing § 103 rejection because the rejection was based on considerable speculation as to the meaning of terms of the claims and assumptions as to their scope). We emphasize that this is a technical reversal of the rejection under 35 U.S.C. § 103(a), and not a reversal based upon the merits of the rejection.

### III. NEW GROUND OF REJECTION

We reject claims 1-11, 15-26, and 30-37 under 35 U.S.C. § 112, ¶ 2 as failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention.

#### A. Findings of Fact

Appellants (App. Br. 5) contend that Specification paragraphs [0030]-[0032] describe the language in question. Specifically the Specification states:

[0030] FIG. 3 is a flowchart of a method of forming a thin-film electrode having gradient properties. The first step of the process is to determine the desired deposition characteristics including the compositional and/or morphological characteristics of the electrode (300) that form compositional and/or morphological characteristic profiles in the film. Accordingly, this step includes a determination of the desired profiles of the deposition characteristics and their profiles. The next step in the process is to provide a substrate on which the electrode is to be formed (step 310). The substrate may

be any suitable substrate. Examples may include porous ceramic substrates or dense electrolyte material.

[0031] Formation of the film on the substrate involves a determination of the necessary thickness deposition profiles of each of the sputter guns (step 320). The present process may utilize a system that includes at least one material deposition device such as a sputter gun. When sputtering material, each sputter gun creates a sputter deposition thickness profile similar to those shown in FIGS. 1, 4A, 5A, and 6A.

[0032] This step also involves a determination of how the necessary thickness deposition profiles created by at least one material deposition device or sputter gun may vary with respect to time. For example, in order to form a film with the desired characteristics determined above (step 300) it may be necessary to vary the thickness deposition profiles with respect to each other such that one is larger than the other during the entire formation process or during certain time periods of the formation process. In the case where a first thickness deposition profile is larger than the other, a substrate advancing between the sputter guns may experience Target 1 material from the first sputter gun before experiencing Target 2 material from the second sputter gun. This may allow for the control of compositional gradients within the film. This compositional control is due to less material being deposited at increased relative distances from the sputter guns. By using the first deposition thickness profile, the material from the first sputter gun will be applied at a relatively large distance. The material deposited at this distance will form a less dense layer, which may include pores, such as nano-pores, meso-pores and/or micro-pores. Nano-pores are pores of less than about 10 nm, mesopores are typically between about 10-100 nm in size, and micropores are greater than about 0.1  $\mu\text{m}$  in size. For convenience, the formation of these pores will be collectively referred to as pores in the specification. The formation of these pores results in nano-chambers formed in the resulting layer, which are pore-sized chambers. These nano-chambers limit the size of metal nano particles through agglomeration (which improves their respective catalytic activity via higher surface area and/or quantum confinement affects), affect mass transport of reactants and products. Further, reduced pore size increases surface

area, which increases the number of catalytic reaction sites. In addition, strain related to the curvature of the material to form the pores may affect the catalytic properties of the materials, etc.

## B. Principles of Law

As stated in *All Dental Prodx*,

The primary purpose of the definiteness requirement is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, e.g., competitors of the patent owner, can determine whether or not they infringe.

*All Dental Prodx, LLC v. Advantage Dental Products, Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002).

Claims are in compliance with 35 U.S.C. § 112, second paragraph, if “the claims, read in light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits.” *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385 (Fed. Cir. 1986), *cert. denied*, 107 S. Ct. 1606 (1987).

“A claim is indefinite if, when read in light of the specification, it does not reasonably apprise those skilled in the art of the scope of the invention.” *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1342 (Fed. Cir. 2003).

## C. Analysis

Appellants’ claims are directed to a method of forming a thin-film fuel cell electrode, comprising, inter alia, “developing a deposition characteristic profile having at least one porous layer based on pre-

determined desired electrode properties.” The Specification provides a general discussion of the variables of a process for producing a thin-film electrode and film characteristics such as thickness, composition, gradient, and porosity. However, there is no description of what process variables or film characteristics are desirable or acceptable. That is, the Specification does not provide a description of the desired compositional and/or morphological characteristics of the electrode. The Specification does not provide a description of the components utilized for deposition (e.g., copper, aluminum, or titanium), or the resulting properties of the deposited film (e.g., film thickness, gradient or porosity). The Specification also does not provide a description as to how the desired compositional and/or morphological characteristics are determined. That is, Appellants have not defined in the Specification how to determine the compositional and/or morphological characteristics related to a predicated outcome. Moreover, there is no discussion as to how to adjust the apparatus to achieve desired or acceptable results.

The claimed invention is not limited to the application of a specific type of thin-film electrode. The claimed invention is sufficiently broad to encompass the application of any type of material layer suitable for deposition to form an electrode. Appellants have not directed us to portions of the Specification that adequately apprise one skilled in the art of the conditions required for selecting the desired electrode properties. That is, Appellants have not identified other characteristics that must be met in order to determine the desired electrode properties. Moreover, Appellants have not identified limits on the process variables that would be required to produce desired electrode properties.



A person of ordinary skill in the art designing a thin-film electrode would not appreciate when the claimed invention has been infringed. *See Advantage Dental Prodx*, 309 F.3d at 779-80. This is because the Specification provides no description of specific desired electrode properties or how to produce such electrodes.

#### D. Conclusion

Because we cannot determine the metes and bounds of the claimed subject matter, we enter a new ground of rejection under 35 U.S.C. § 112, second paragraph. Because deciding the issues relevant to the obviousness rejections would require improper speculation with regard to the meaning of the claims, we do not sustain the rejections under 35 U.S.C. § 103(a).

### VII. DECISION

The decision of the Examiner is reversed and a new ground of rejection entered with regard to all the claims on appeal.

### VIII. TIME PERIOD FOR RESPONSE

This decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b). 37 C.F.R. § 41.50(b) provides "[a] new ground of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

(2) *Request rehearing*. Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(v).

REVERSED  
NEW GROUND OF REJECTION (37 C.F.R. § 41.50(b))

PL Initial:  
sld

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